

# A Comparison of Existing and Proposed Policy in Regards to Non-TSO Functions



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# Current US TSO Policy allows Non-TSO Functions

## **Excerpt from Paragraph 17.d.(3) of FAA Order 8150.1B:**

**(3)** No applicable TSO for a function. When there is no TSO appropriate to a function provided by the system, the TSO authorization for the other functions should not refer to that non-TSO function, and that function must be evaluated for safety and performance of its intended function under the appropriate airworthiness certification procedures when seeking aircraft installation approval. The manufacturer should be instructed to list functions that are not covered by any TSO in the IM and/or CMM.

(Similar wording was in Order 8150.1A, Para. 18b(3))



# Weaknesses of current policy

- **Current policy implies that the non-TSO function can be included in the TSO design data – just not evaluated.**
  - ✓ No requirement to review intended performance.
  - ✓ No assurance that hosting TSO's required performance is not affected.
  - ✓ No assurance that hosting TSO limitations are not violated.
- **Treats the non-TSO integrated function as if its design were under the control of the installer.**
  - ✓ Many times just additional lines of S/W code.
  - ✓ How can the installer revise a design that it doesn't control?
- **Assumes non-TSO function will be thoroughly evaluated upon installation.**
  - ✓ Installer typically does not have the equipment or expertise to do a proper "box-level" performance evaluation.
  - ✓ No credit given to the environmental/software evaluations or performance testing accomplished by the TSO manufacturer.

# Proposed New US TSO Policy for Non-TSO Functions

- **New policy corrects inadequacies of existing policy by providing increased oversight at the time of TSO approval...where it belongs!**
  - ✓ Requires identification of non-TSO function.
  - ✓ Requires manufacturer declared performance of non-TSO function to be reviewed by the ACO.
  - ✓ Requires manufacturer to show that non-TSO function is compatible with hosting TSO's required performance and limitations prior to TSOA letter issuance.
  - ✓ Acknowledges the environmental, software, and performance testing that was accomplished on the non-TSO function to support installation.
  - ✓ Keeps design data control of the non-TSO function where it belongs....with the TSO manufacturer!



# Proposed New US TSO Policy for Non-TSO Functions (Cont'd)

- **New policy compatible with existing TC/STC practices.**
  - ✓ Non-TSO function acknowledged in TSO authorization letter as additional “accepted” function.
    - ❖ Software, environmental and performance evaluation of the non-TSO function - at the box level – already accomplished.
  - ✓ Installation data/instructions address both the TSO and non-TSO function – to include ICA.
  - ✓ Both the TSO and non-TSO function require installation evaluation to appropriate airworthiness rules – no change!
  - ✓ Major/minor changes to the non-TSO function handled the same as if driven by the TSO function – inseparable
  - ✓ Any future airworthiness action caused by non-TSO function traceable to box H/W and/or S/W part number – just as if the TSO function was the culprit (14 CFR §21.619 enforcement).



# ACO Review of the Non-TSO Function

- **Not approving the manufactured declared performance standard - but accepting it.**
  - ✓ Same as with the hosting TSO performance.
- **The ACO needs to understand how the added non-TSO function performs.**
  - ✓ Does it perform (at the article level) as the manufacturer intended?
  - ✓ Does it interfere with the required performance of the hosting TSO?
  - ✓ Does manufacturers proposed test plan adequately evaluate performance? Is is testing sufficiently robust?
  - ✓ Do you see any possible conflicts with airworthiness rules for intended installation?
    - ❖ Improper use of colors, workload issues, etc.

# ACO Review of the Non-TSO Function (cont'd)

- If the non-TSO function is of a simple nature and easily bounded, ACO review of the manufacturers declared performance standard should be sufficient and a concurrent TC/STC evaluation would not be needed.
- The ACO should require a parallel TC/STC evaluation if it is determined that the added non-TSO function:
  - ✓ Is complex and not easily bounded.
  - ✓ Has a high degree of system flight deck to pilot interface.
  - ✓ The system has multiple TSO's bundled together, or large content of non-TSO functionality.
- If a TC/STC project is being accomplished at an ACO that is different than the TSO accepting ACO, then both offices should coordinate in the review of the manufacturers declared performance standard.



# PSP Considerations

- Will a TSO Plan (similar to a cert plan) be used?

What will it contain?

- ✓ TSO Plans are recommended when dealing with “non - TSO functions” (N 8110.NTF section 4.b). General formats for the TSO Plan could be included in the PSP.
- ✓ Examples of what could be included in the TSO Plan are:
  - ❖ Listing of functions, both TSO and non-TSO
  - ❖ Proposed schedules
  - ❖ Proposed deviations
  - ❖ Proposed specific Designee usage
  - ❖ Any unique or unusual situations that may require additional time for the ACO to evaluate
  - ❖ Outsourcing
  - ❖ Other specifics that may be too detailed for an overall PSP
  - ❖ **There is a TSOA PSCP example in “The FAA & Industry Guide to Product Certification – Sept. 2004”**



# PSP Considerations (continued)

- What are the Metrics that will be used to determine the ACO level of involvement?
  - ✓ Examples could include:
    - ❖ The degree of complexity
    - ❖ New/Novel technology
    - ❖ The need for Pilot evaluations
    - ❖ Designee Usage
    - ❖ Applicant History
    - ❖ Outsourcing to a new supplier

# PSP Considerations (continued)

- How will Designees be used?
  - ✓ Software & complex hardware “recommend” and “approve” 8110-3s.
  - ✓ Data review as a “company expert” in certification (no 8110-3s)
- Identify unique considerations that may have to be implemented to support this new policy
- Identify overall processes that help ensure the policy is met.
  - ✓ Applicant Processes
    - ❖ Change processes
    - ❖ Testing processes
  - ✓ ACO Processes
  - ✓ Processes for determining concurrent TC/STC program



# Proposed Notice 8150.NTF

- Notice of availability for comment published in the US Federal Register, Vol. 70, No. 103 on May 31, 2005
  - ✓ Comment period closed on June 30, 2005.
  - ✓ Comments are in the disposition process
- Field Clearance Record comment period started on May 26, 2005
  - ✓ Comment period closed on June 30, 2005
  - ✓ Comments are in the disposition process
- Comment disposition and final publication of Notice 8150.NTF targeted for August this year.
- Notice to be incorporated into Order 8150.1C at next revision.



# Future Actions/Coordination

- Notice 8150.NTF currently addresses procedures when a non-TSO function is included in an article that a US Manufacturer is seeking TSO authorization.
- Once Notice has been issued, coordination efforts will begin with AIR-40 to harmonize the procedures with EASA.